KANSAS-LOWER REPUBLICAN BASIN TOTAL MAXIMUM DAILY LOAD

Waterbody: **Elk and Banner Creeks**
Water Quality Impairment: Ammonia

1. INTRODUCTION AND PROBLEM IDENTIFICATION

Subbasin: Delaware Counties: Jackson

HUC 8: 10270103 HUC 11s: Not applicable

Drainage Area: Approximately 62 sq. mi. above confluence of Delaware River

Main Stem Segments: 29: Elk Creek and a main tributary, Banner Creek, segment 45

Tributary Segments: Not applicable

Designated Uses: Both Expected Aquatic Life Support and Secondary Contact Recreation; Elk: Primary Contact Recreation and Food Procurement; Banner: Domestic Water Supply

1998 303d Listing: Table 1 - Predominant Point and Non-point Source Impacts

Impaired Use: Expected Aquatic Life Support on Segments 29 and 45

Water Quality Standard: 1.27 mg/l Ammonia (as N) at pH of 8.0

2. CURRENT WATER QUALITY CONDITION AND DESIRED ENDPOINT

Level of Support for Designated Use under 303d: Not Supporting

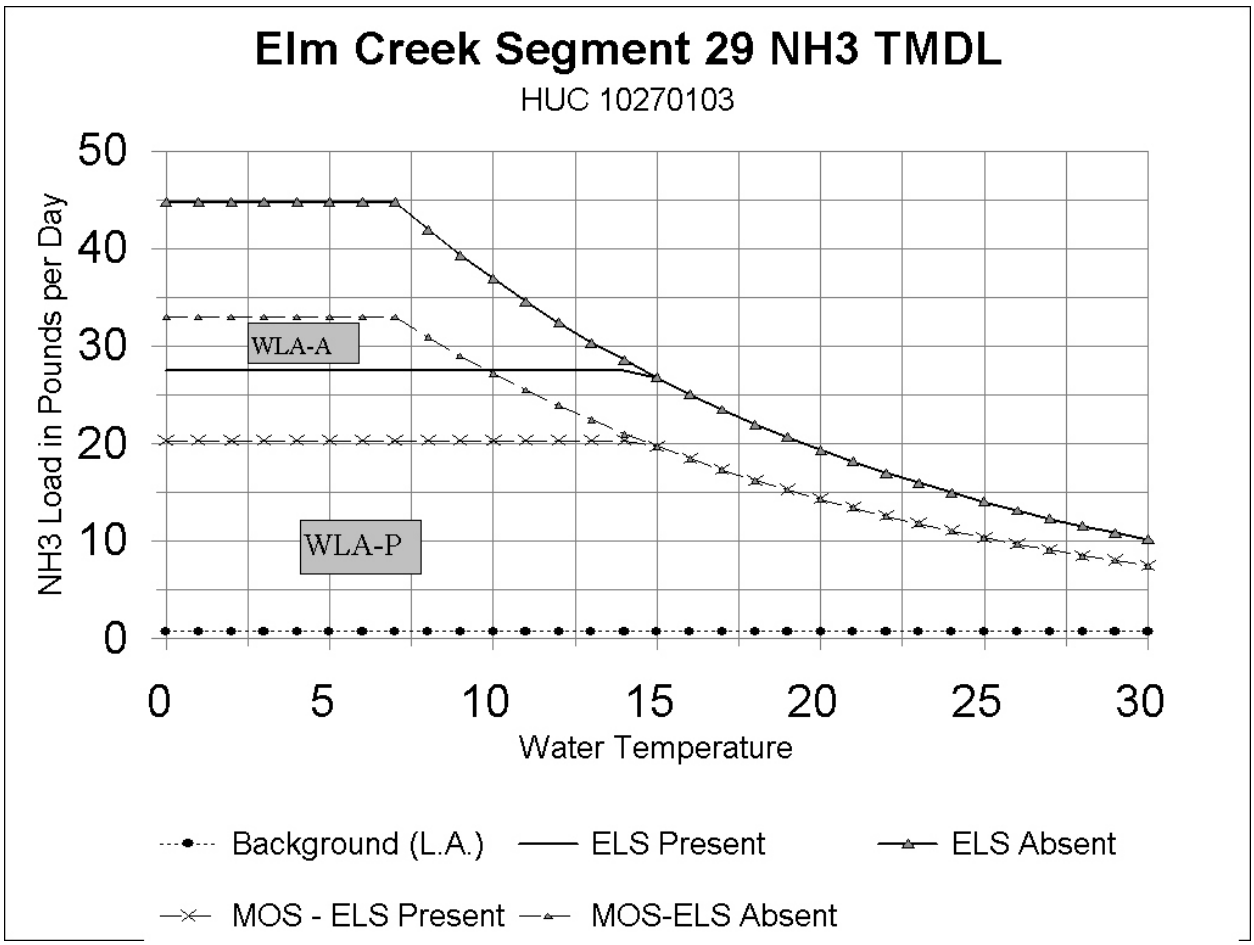
Monitoring Sites: None

Period of Record Used: Ammonia Wasteload Modeling was used

Flow Record: Estimated

Long Term Flow Conditions: 30Q10 = 1 cfs

Current Condition: Wasteload modeling indicates impairment to aquatic life from elevated ammonia concentrations in river at critical low flow. The Expected Aquatic Life Use designation on Elk Creek allows the mixing zone to use 100% of the river. The Expected Aquatic Life Use and the ratio of receiving flow to effluent flow on Banner Creek require a mixing zone limited to 50% of the stream flow. Both mixing zones are within 300 meters downstream of the outfall and the mixing zones on each creek are not to come together.



Total Maximum Daily Load = 10.6 Pounds per Day of Ammonia (as N) for Elk Creek; 8.4 Pounds per Day of Ammonia (as N) on Banner Creek

3. SOURCE INVENTORY AND ASSESSMENT

NPDES: There is a single NPDES permitted facility on each river segment, which discharge ammonia under their permits. Both have permits which expire in 2001.

Oldham's Industries has an existing permit to discharge up to 2.5 mg/l of Ammonia (as N) at a design flow of 0.16 MGD (0.25 cfs).

The City of Holton is under an existing permit to discharge up to 4.5 mg/l of Ammonia (as N) at a design flow of 0.36 MGD (0.55 cfs).

Population projections for Holton indicate that the city will likely grow by 28% by the year 2020, water use will grow as well which will induce more waste water going through the treatment system, however the volume of waste water should remain within the design flow of the treatment plant, offsetting the need for an expansion in the foreseeable future.

Non-point Sources: Because the impairment is anticipated under critical dry conditions, minimal non-point source contributions are anticipated. Analysis of low flows on small streams in the Kansas Basin, indicates flows around 1 cfs should be anticipated from these unregulated tributary streams. Background concentrations entering the reaches are assumed to be 0.15 mg/l of Ammonia (as N), a value which is fairly supported by ambient data collected around the basin.

4. ALLOCATION OF POLLUTION REDUCTION RESPONSIBILITY

Point Sources: Wasteload Allocations for the two reaches after accounting for background loads and a margin of safety are **8.7 Pounds per Day of Ammonia (as N) for Elk Creek and 6.6 Pounds for Banner Creek**. Under existing permits, Oldhams has a potential loading of 3.4 Pounds per Day of Ammonia (as N) and Holton has 13.3 Pounds per Day of Ammonia (as N). The Holton loading is over the calculated Wasteload Allocations, while the loading for Oldham's is within its Wasteload Allocation. However, the Banner Creek mixing zone policy of the Water Quality Standards restricts the mixing of the wastewater from dischargers when river flow exceeds effluent by 3:1 to the Expected Aquatic Life Support level of 50% of the river. This reduces the Wasteload Allocation on Banner Creek based on restricted mixing zones to 4.2 Pounds, which still assimilates the current loading from Oldham's. A reduction of 33% is antipated to be necessary for Holton.

Non-Point Sources: Based on the instream backgrovnd level of 0.15 mg/l of Ammonia (as N), the Load Allocation for both reaches under this TMDL will be **0.8 Pounds per Day of Ammonia (as N)**. No other non-point source allocations are seen to be necessary.

Defined Margin of Safety: The Margin of Safety will be set at 10% of the TMDL or **1.1 Pounds of Ammonia (as N) on Elk Creek; 0.8 Pounds on Banner Creek.**

State Water Plan Implementation Priority: Because this stream segment may be improved through point source pollution reduction in a relatively short timeframe, this TMDL will be a **High Priority** for implementation.

Unified Watershed Assessment Priority Ranking: This watershed lies within the Delaware Subbasin (HUC 8: 10270103) with a **priority ranking of 3 (Highest Priority for restoration work).**

Priority HUC 11s and Stream Segments: Because of the point source nature of the TMDL, no attention needs to be directed to the adjoining HUC 11 subwatersheds. The priority stream segment of this TMDL will be Elk Creek receiving the wasteloads from the Holton Plant; Stream Segment 29; and Banner Creek receiving the wasteload from Oldham's, Stream Segments 45.

5. IMPLEMENTATION

Desired Implementation Activities

1. Issue NPDES permits with appropriate ammonia limits so water quality standards are met at critical low flow conditions.

Implementation Programs Guidance

NPDES - Municipal Program - KDHE

a. Issue renewed NPDES permit for Holton with ammonia limits and schedule of compliance for any treatment plant upgrades which are necessary to reduce ammonia loading in order to meet water quality standards.
b. Evaluate information suggesting a 3-fold increase in winter limits in ammonia concentrations is permissible.
c. Evaluate the need for financial loan assistance to Holton to fund treatment plant expansion and upgrade.
d. Evaluate the mixing zones of both discharges to ensure they do not merge below the confluence of Elk and Banner Creeks.

NPDES - Industrial Program - KDHE

a. Issue renewed NPDES permit for Oldham's with ammonia limits and schedule of compliance for any treatment plant upgrades which are necessary to reduce ammonia loading in order to meet water quality standards.
b. Evaluate any information on mixing zone geometry within Segment 45 to ensure the mixing zone does not extend below the confluence with Elk Creek
c. Evaluate information suggesting a 3-fold increase in winter limits in ammonia concentrations is permissible.

Timeframe for Implementation: NPDES Permits should be issued in 2001. Any necessary schedule of compliance should have initial phase begun before 2005. Treatment upgrades which are necessary should be completed prior to 2008.

Targeted Participants: Primary participants for implementation will be public works personnel at Holton and the operations manager at Oldham's.

Milestone for 2004: The year 2004 marks the mid-point of the ten year implementation window for the segment. At that point in time, plans for any plant upgrades necessary for compliance with the existing permit issued in 2001.

Delivery Agents: KDHE staff in the Municipal and Industrial Programs will develop the appropriate permits, schedules of compliance and review of plans. Review of technical information and studies will be made by KDHE staff of the Technical Services section and the Bureau of Environmental Field Services.

Reasonable Assurances:

Authorities: The following authorities may be used to direct activities in the watershed to reduce pollution.

1. K.S.A. 65-164 and 165 empowers the Secretary of KDHE to regulate the discharge of sewage into the waters of the state.

2. K.S.A. 65-171d empowers the Secretary of KDHE to prevent water pollution and to protect the beneficial uses of the waters of the state through required treatment of sewage and established water quality standards and to require permits by persons having a potential to discharge pollutants into the waters of the state.

3. K.S.A. 65-3335 empowers the Secretary of KDHE to provide financial assistance for wastewater treatment through the State Revolving Loan Fund.

Funding: The State Revolving Loan Fund is operated through the Municipal Program at KDHE and provides low interest loans for wastewater treatment improvement. Since its inception, $128 million in loans have been made to municipal dischargers in the state.

Effectiveness: Nitrification techniques within mechanical treatment plans such as the North Topeka Plant have been very effective in reducing ammonia concentrations within wastewater effluent. Typical levels of ammonia concentrations from upgraded treatment are in the 2 mg/l range.

6. MONITORING

Intensive sampling of streamflow, pH, temperature and ammonia will be made if flow conditions fall below 1 cfs. Routine sampling of effluent quality will be a condition of the issued permits with testing frequency consistent with Kansas Surface Water Implementation Procedures.

7. FEEDBACK

Public Meetings: Public meetings to discuss TMDLs in the KLR Basin were held March 10, 1999 in Topeka, April 27 in Lawrence and April 29 in Manhattan. An active Internet Web site was established at http://www.kdhe.state.ks.us/tmdl/ to convey information to the public on the general establishment of TMDLs and specific TMDLs for the Kansas-Lower Republican Basin.

Public Hearing: A Public Hearing on the TMDLs of the Kansas-Lower Republican Basin was held in Topeka on June 3, 1999.

Basin Advisory Committee: The Kansas-Lower Republican Basin Advisory Committee met to discuss the TMDLs in the basin on December 3, 1998; January 14, 1999; February 18, 1999; March 10, 1999; May 20, 1999 and June 3, 1999.

Discussion with Interest Groups: Meetings to discuss TMDLs with interest groups include:

Agriculture: November 10, 1998; December 18, 1998; February 10, 1999; April 10, 1999 and May 4, 1999.

Municipal: November 12, 1998, January 25, 1999; March 1, 1999; and May 10, 1999.

Environmental: November 3, 1998; December 16, 1998; February 13, 1999; March 15,

1999, April 7, 1999 and May 3, 1999.
Conservation Districts: March 16-18, 24-25, 1999

Milestone Evaluation: In 2004, evaluation will be made as to the degree of permit compliance by Holton and Oldham's.

Consideration for 303d Delisting: This stream segment will be evaluated for delisting under Section 303d, based on the compliance with the permits issued in 2001. If any necessary upgrades in treatment are in place prior to 2004, the stream may be delisted in the 2004 303d list. Any upgrades which will be completed prior to 2008 will support delisting in the 2008 303d list. Should modifications be made to the applicable water quality criteria during 2000-2008, considerations for continued listing or earlier delisting may be made over the next ten years.

Incorporation into Continuing Planning Process, Water Quality Management Plan: Under the current version of the Continuing Planning Process, the next anticipated revision will come in 2002 which will emphasize revision of the Water Quality Management Plan. At that time, incorporation of this TMDL will be made into both documents.

Addressed with NPDES permit.